WHAT IS CLAIMED AS NEW AND DESIRED TO BE PROTECTED BY LETTERS PATENT OF THE UNITED STATES OF AMERICA, IS:

1. A composite drive shaft, comprising:

a radially outer tubular member fabricated from a metal material and having an inner peripheral annular wall surface portion; and

a radially inner carbon fiber tubular liner fixedly secured upon said inner peripheral annular wall surface portion of said radially outer tubular member.

2. The composite drive shaft as set forth in Claim 1, wherein:

said radially outer tubular member is fabricated from a metal selected from the group comprising steel, aluminum, and titanium.

3. The composite drive shaft as set forth in Claim 1, wherein:

said radially outer tubular member has first predetermined torsional stiffness properties;

said radially inner carbon fiber tubular liner has second predetermined torsional stiffness properties; and

said radially inner carbon fiber tubular liner is integrally bonded upon said inner peripheral annular wall surface portion of said radially outer tubular member so as

to effectively positively enhance said first predetermined torsional stiffness properties of said radially outer tubular member such that the torsional stiffness properties of said composite drive shaft are greater than said first predetermined torsional stiffness properties of said radially outer tubular member whereby said composite drive shaft can be operated under high-speed rotary conditions.

4. The composite drive shaft as set forth in Claim 1, wherein:

a radially outer peripheral wall surface portion of said radially inner carbon fiber tubular liner is integrally bonded upon said radially inner peripheral wall surface portion of said radially outer tubular member so as to effectively seal the annular interface defined between said radially outer peripheral wall surface portion of said radially inner carbon fiber tubular liner and said radially inner peripheral wall surface portion of said radially outer tubular member whereby moisture cannot penetrate said annular interface defined between said radially outer peripheral wall surface portion of said radially inner carbon fiber tubular liner and said radially inner peripheral wall surface portion of said radially outer tubular member such that said radially outer tubular metal member will not corrode and the structural integrity of said radially inner carbon fiber tubular liner will not be compromised.

5. The composite drive shaft as set forth in Claim 3, wherein:

the axial length dimension of said radially outer tubular member is greater than the axial length dimension of said radially inner carbon fiber tubular liner such that recessed space regions are defined within opposite axial end portions of said composite drive shaft for accommodating balancing weights in order to rotationally balance said composite drive shaft under high-speed rotary conditions.

6. A composite rotary steel drive shaft, comprising:

a radially outer tubular member fabricated from steel and having an inner peripheral annular wall surface portion; and

a radially inner carbon fiber tubular liner fixedly secured upon said inner peripheral annular wall surface portion of said radially outer tubular member so as to form said composite rotary steel drive shaft.

7. The composite rotary steel drive shaft as set forth in Claim 6, wherein:

said radially inner carbon fiber tubular liner is integrally bonded upon said inner peripheral annular wall surface portion of said radially outer tubular steel member whereby said composite rotary steel drive shaft is considered to be a rotary steel drive shaft sanctioned by automotive racing authorities.

8. The composite rotary steel drive shaft as set forth in Claim 6, wherein:

said radially outer tubular member has first predetermined torsional stiffness properties;

said radially inner carbon fiber tubular liner has second predetermined torsional stiffness properties; and

said radially inner carbon fiber tubular liner is integrally bonded upon said inner peripheral annular wall surface portion of said radially outer tubular member so as to effectively positively enhance said first predetermined torsional stiffness properties of said radially outer tubular member such that the torsional stiffness properties of said composite rotary steel drive shaft are greater than said first predetermined torsional stiffness properties of said radially outer tubular member whereby said composite drive shaft can be operated under high-speed rotary conditions.

9. The composite rotary steel drive shaft as set forth in Claim 6, wherein:

said radially outer tubular member has first predetermined torsional stiffness properties;

said radially inner carbon fiber tubular liner has second predetermined torsional stiffness properties; and

said radially inner carbon fiber tubular liner is integrally bonded upon said inner peripheral annular wall surface portion of said radially outer tubular member so as to effectively positively enhance said first predetermined torsional stiffness properties of said radially outer tubular member such that the torsional stiffness properties of said

composite rotary steel drive shaft are greater than said first predetermined torsional stiffness properties of said radially outer tubular member whereby said composite drive shaft can be operated under high-speed rotary conditions within the vicinity of ten thousand revolutions per minute (10,000 RPM) without experiencing bending deflections.

10. The composite rotary steel drive shaft as set forth in Claim 6, wherein:

said radially outer tubular member has first predetermined torsional stiffness properties;

said radially inner carbon fiber tubular liner has second predetermined torsional stiffness properties; and

said radially inner carbon fiber tubular liner is integrally bonded upon said inner peripheral annular wall surface portion of said radially outer tubular member so as to effectively positively enhance said first predetermined torsional stiffness properties of said radially outer tubular member such that the torsional stiffness properties of said composite rotary steel drive shaft are greater than said first predetermined torsional stiffness properties of said radially outer tubular member whereby said composite drive shaft can be operated under high-speed rotary conditions without experiencing adverse resonant vibrations.

11. The composite rotary steel drive shaft as set forth in Claim 6, wherein:

a radially outer peripheral wall surface portion of said radially inner carbon fiber tubular liner is integrally bonded upon said radially inner peripheral wall surface portion of said radially outer tubular member so as to effectively seal the annular interface defined between said radially outer peripheral wall surface portion of said radially inner carbon fiber tubular liner and said radially inner peripheral wall surface portion of said radially outer tubular member whereby moisture cannot penetrate said annular interface defined between said radially outer peripheral wall surface portion of said radially inner carbon fiber tubular liner and said radially inner peripheral wall surface portion of said radially outer tubular member such that said radially outer tubular metal member will not corrode and the structural integrity of said radially inner carbon fiber tubular liner will not be compromised.

12. The composite rotary steel drive shaft as set forth in Claim 8, wherein:

the axial length dimension of said radially outer tubular member is greater than the axial length dimension of said radially inner carbon fiber tubular liner such that recessed space regions are defined within opposite axial end portions of said composite drive shaft for accommodating balancing weights in order to rotationally balance said composite drive shaft under said high-speed rotary conditions.

13. An automotive motor vehicle drive train system, comprising:

an automotive engine;

an automotive transmission operatively connected to said automotive engine;

automotive drive wheels; and

a composite rotary steel drive shaft assembly operatively interconnecting said automotive engine and transmission components to said automotive drive wheels,

said composite rotary steel drive shaft assembly comprising a radially outer tubular member fabricated from steel and having an inner peripheral annular wall surface portion, and a radially inner carbon fiber tubular liner fixedly secured upon said inner peripheral annular wall surface portion of said radially outer tubular member so as to form said composite rotary steel drive shaft assembly.

14. The automotive motor vehicle drive train system as set forth in Claim 13, wherein:

said radially inner carbon fiber tubular liner is integrally bonded upon said inner peripheral annular wall surface portion of said radially outer tubular steel member whereby said composite rotary steel drive shaft is considered to be a rotary steel drive shaft sanctioned by automotive racing authorities.

15. The automotive motor vehicle drive train system as set

forth in Claim 13, wherein:

said radially outer tubular member has first predetermined torsional stiffness properties;

said radially inner carbon fiber tubular liner has second predetermined torsional stiffness properties; and

said radially inner carbon fiber tubular liner is integrally bonded upon said inner peripheral annular wall surface portion of said radially outer tubular member so as to effectively positively enhance said first predetermined torsional stiffness properties of said radially outer tubular member such that the torsional stiffness properties of said composite rotary steel drive shaft are greater than said first predetermined torsional stiffness properties of said radially outer tubular member whereby said composite drive shaft can be operated under high-speed rotary conditions.

16. The automotive motor vehicle drive train system as set forth in Claim 13, wherein:

said radially outer tubular member has first predetermined torsional stiffness properties;

said radially inner carbon fiber tubular liner has second predetermined torsional stiffness properties; and

said radially inner carbon fiber tubular liner is integrally bonded upon said inner peripheral annular wall surface portion of said radially outer tubular member so as to effectively positively enhance said first predetermined torsional stiffness properties of said radially outer tubular member such that the torsional stiffness properties of said composite rotary steel drive shaft are greater than said

first predetermined torsional stiffness properties of said radially outer tubular member whereby said composite drive shaft can be operated under high-speed rotary conditions within the vicinity of ten thousand revolutions per minute (10,000 RPM) without experiencing bending deflections.

17. The automotive motor vehicle drive train system as set forth in Claim 13, wherein:

said radially outer tubular member has first predetermined torsional stiffness properties;

said radially inner carbon fiber tubular liner has second predetermined torsional stiffness properties; and

said radially inner carbon fiber tubular liner is integrally bonded upon said inner peripheral annular wall surface portion of said radially outer tubular member so as to effectively positively enhance said first predetermined torsional stiffness properties of said radially outer tubular member such that the torsional stiffness properties of said composite rotary steel drive shaft are greater than said first predetermined torsional stiffness properties of said radially outer tubular member whereby said composite drive shaft can be operated under high-speed rotary conditions without experiencing adverse resonant vibrations.

18. The automotive motor vehicle drive train system as set forth in Claim 13, wherein:

a radially outer peripheral wall surface portion of

said radially inner carbon fiber tubular liner is integrally bonded upon said radially inner peripheral wall surface portion of said radially outer tubular member so as to effectively seal the annular interface defined between said radially outer peripheral wall surface portion of said radially inner carbon fiber tubular liner and said radially inner peripheral wall surface portion of said radially outer tubular member whereby moisture cannot penetrate said annular interface defined between said radially outer peripheral wall surface portion of said radially inner carbon fiber tubular liner and said radially inner peripheral wall surface portion of said radially outer tubular member such that said radially outer tubular metal member will not corrode and the structural integrity of said radially inner carbon fiber tubular liner will not be compromised.

19. The automotive motor vehicle drive train system as set forth in Claim 13, wherein:

the axial length dimension of said radially outer tubular member is greater than the axial length dimension of said radially inner carbon fiber tubular liner such that recessed space regions are defined within opposite axial end portions of said composite drive shaft for accommodating balancing weights in order to rotationally balance said composite drive shaft under said high-speed rotary conditions.